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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/507,079	02/18/2000	Masataka Kadowaki	10876.45US01	8450

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MERCHANT & GOULD PC  
P.O. BOX 2903  
MINNEAPOLIS, MN 55402-0903

EXAMINER
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HANDAL, KAITI V

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/507,079	KADOWAKI ET AL.	
	Examiner	Art Unit	
	Kaity Handal	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 7-9 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, 7-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trocciola et al. (USP 5,330,727) in view of Heil et al. (US 5,874,051).

Regarding claims 1, 7 and 9 Trocciola discloses a CO remover comprising: an air mixer (19) for mixing air with hydrogen-rich gas including CO to generate mixed gas; a selective oxidative catalytic device (20, 30) for selectively oxidizing the CO by having the mixed gas pass through a selective oxidative catalyst bed (22, 32); the selective oxidative catalytic device including a gas passing tube (21, 31) that has the selective oxidative catalyst bed (22, 32). Additionally the reference discloses that it is desired to maintain the temperature of the of the catalyst within predetermined limit to avoid deactivation of catalyst (C1/L45-60) and to minimize the carbon monoxide in the hydrogen rich gas (C2/L35-39) by, for example cooling medium baths (C7/L1 1-31).

Trocciola fails to show a gas blending unit within the selective oxidation catalyst bed for blending part of the mixed gas that is passing through the selective oxidative catalyst bed further from an inner surface of the gas passing tube and remaining part

of the mixed gas that is passing through the catalyst bed nearer to the inner surface of the gas passing tube (21, 31); wherein the gas blending unit is formed from an element partially obstructing the gas passing tube; and the element is circularly disposed around the inner surface of the gas passing tube. Heil teaches an apparatus for selective catalytic oxidation (figure 1) comprising a gas passing tube/reaction chamber (2), a gas blending unit/static mixing structures (8) within the selective oxidation catalyst beds (5) for blending part of the mixed gas that is passing through the selective oxidative catalyst beds (5) further from an inner surface of the gas passing tube/reaction chamber (2) (as illustrated) and remaining part of the mixed gas that is passing through the catalyst bed nearer to the inner surface of the gas passing tube; wherein the gas blending unit/static mixing structures (8) is formed from an element partially obstructing the gas passing tube/reaction chamber (2) (as illustrated); and the element is a washer ring and is circularly disposed around the inner surface of the gas passing tube/reaction chamber (2) (as illustrated) in order to help mix the oxidizing gas with the rest of the mixed gas stream to enrich it and guide the flow (col. 3, lines 66-67 and col. 4, lines 1-2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include gas blending unit/static mixing structures in the gas passing tube of Trocciola's apparatus, as taught by Heil, in order to help mix the oxidizing gas with the rest of the mixed gas stream to enrich it and guide the flow.

Regarding claim 4, Heil further teaches a cooling mechanism which includes a heat sink/cooling chamber (6) (as illustrated) adjacent to the outer surface of the gas passing tube (illustrated) in order to cool the carbon monoxide oxidation reactor (1) (C3/L50-51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the CO remover of Trocciola, as taught by Heil, in order to carbon monoxide oxidation reactor.

Regarding claim 8, Heil further teaches wherein a portion of the internal sectional area of the gas passing tube (illustrated in figure 1) is obstructed by the element/static mixing structures (8). While the reference does not explicitly disclose the specific percentage of the internal sectional area, which is being obstructed, the size of the element, and therefore the specific percentage of the internal sectional area, which is being obstructed, is not considered to confer patentability to the claims. As the amount of cooling provided to the remover is variable(s) that can be modified, among others, by adjusting said size of the element, and therefore the specific percentage of the internal sectional area which is being obstructed, with said cooling increasing as the size of the element and the specific percentage of the internal sectional area which is being obstructed is increased, the precise size of the element would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed size of the element and the specific percentage of the internal sectional area, which is being obstructed, cannot be

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considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the size of the element and the specific percentage of the internal sectional area which is being obstructed in the remover of Trocciola et al. to obtain the desired cooling (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Regarding claim 12, Trocciola et al. in view of De Rycker et al. disclose all of the claim limitations as set forth above. Additionally Trocciola et al. discloses the CO remover further comprising: a cooling unit for cooling the selective oxidative catalyst bed from outside upstream from the gas blending unit (C7/L1 1-31); wherein the cooling unit includes a channel adjacent to an outer surface of the gas passing tube, through which cooling medium passes (C7/L11-31); and wherein a length between a start of the selective oxidative catalyst bed in a direction of a flow of the mixed gas and the gas blending unit (18) is no shorter than 1/3 of a length between the start of the selective oxidative catalyst bed and the end of the selective oxidative catalyst bed in the direction of the flow of the mixed gas (Fig. 1).

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 10249 or (g) prior art under 35 U.S.C. 103(a).

### **Response to Arguments**

Applicant's arguments with respect to claims 1, 4, 7-9 and 12 have been considered but are moot in view of the new ground(s) of rejection.

### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KH

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7/7/2006

  
ALEXA DOROSHENK NECKEL  
PRIMARY EXAMINER